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EDUCATIONAL PSYCHOLOGY

A TREATISE

FOR

PARENTS AND EDUCATORS

BY

LOUISA PARSONS HOPKINS

BOSTON

LEE AND SHEPARD, PUBLISHERS

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TO VVVV
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PREFACE.

THIS treatise is the digest of a course of lectures given to the Normal Class of the Swain Free School, New Bedford, and is the result of long and attentive observation of mental phenomena and development, carefully selected reading, and such original thought and organizing power as I could bring to a subject in which, as parent and teacher, I have been deeply interested.

I acknowledge my indebtedness to modern scientific writers on the mental and nervous activities, and specifically to President Hopkins for the theory of the potentiality of the body presented in the first chapter.

The text, although containing all essential data and principles, is condensed, and admits of much amplification and illustration; for I conceive it to be an essential feature of a good text-book, that it shall leave the field open for original thought and observation, and give opportunity for free discussion in the class-room, or in the mind of the reader.

A sequent volume is in course of preparation on the moral nature, with its activities and relations.

LOUISA PARSONS HOPKINS.

JUNE, 1886.

EDUCATIONAL PSYCHOLOGY.

CHAPTER I.

PSYCHOLOGY.

"O Callias," said Socrates, "if your two sons were foals or calves, there would be no difficulty in finding some one to put over them; we should hire a trainer of horses or a farmer who would improve them in their own proper virtue and excellence; but as they are human beings, whom do you think of placing over them?" — *Plato*.

THE teacher must have a knowledge of his material; he must understand the nature and laws of the human mind and body, or he is not prepared to train and develop them; he must be acquainted with all that makes up the unity of the human being, if he would be able to direct its education; he must have learned the science of the body, which is physiology, and the science of the mind and soul, which is psychology, or he is in no degree fitted to assume the office of teacher. It would be as absurd for one to undertake to educate the young with no knowledge of physiology or psychology, as for one

to attempt to produce a sonata while ignorant of the phenomena of sound, and the laws of musical composition and harmony.

Psychology gives us the knowledge of the nature and order of the faculties of the mind and soul; it reveals the laws of activity and growth of the mental and moral powers. By many writers it is limited to the mind and its activities. It is the science of the immortal part of man, and with physiology takes the whole man as its subject. It is a descriptive science, taking the mental and moral constitution of man as the field of its observation. It is founded on the introverted subjective observation of the mature mind, the analysis of experience, and upon the objective observation of the activities and growth of childhood. It was studied experimentally in this latter way by Pestalozzi and Frœbel, among educators; by metaphysicians it has been studied subjectively.

Psychology is closely related to philosophy, logic, and metaphysics, but differs from each. Philosophy is the science of the forces and laws of the universe, material and immaterial. Socrates created an epoch in philosophy by directing observation upon man himself, making the study of mind its grand object.

“He gave intuition as its method, self-knowledge as its starting point, and moral perfection as its end.”

Metaphysics, so called, as coming naturally after physics or the science of matter, is a department of philosophy which deals with pure reason and the essence of mind, and is most closely allied to psychology, but wider, more inclusive, and less purely descriptive. Logic is the science and art of reasoning, and gives the laws of deduction, teaching us to think, reason, and judge correctly. Successive schools of philosophy have prevailed since the Greeks. Modern philosophy took the place of the fantastic ideas of mediæval philosophy by a vigorous observation of mental processes. Francis Bacon, the originator of modern methods of scientific research, gave us the method of induction, which by observation and comparison ascertains the essential conditions of phenomena, and by experiment discovers their laws. This mode substitutes nature and experiment for conceptions and logic, and is now applied to every department of philosophy; by its use a science of psychology has been arrived at which is sufficiently complete to furnish the teacher with a basis for his art.

The Greeks gave us philosophy, or the love of

wisdom, through all their greatest spirits, Pythagoras, Socrates, and Plato, the world's educators. They also gave us psychology, endowing it with form and life by the personification of their mythology, and in its very name expressing its symbolic conception. Psyche was the latest and fairest of the gods in the universal mythology which the Greeks gave to humanity ; she embodied an ideal which could spring only from an exalted culture and mature habit of thought.

In the modern scientific methods of thought we express the subject more analytically. Psychology is our knowledge of mind arranged according to laws of science. The essence of mind is perhaps unfathomable ; its activities and states are the subject of psychology. We assume the existence of mind ; its exact scope and nature are investigated by philosophy.

Mind includes not only intelligence but feeling, — the inner world of man, corresponding to the outer world, — which is matter. We believe in our senses and therefore we believe in matter, which is a fact of variable quantity and quality. It may exist in such extreme attenuation as to be confounded in imagination with spirit or force, as in the molecules which fill

the interstellar spaces and convey movements of electricity, light, and sound.

We know little of the tenuity possible to matter. The mind is immaterial, but embodied in the material; all mental processes are connected with physical processes; the most abstract thought is dependent on the activity of the brain. We cannot analyze either so thoroughly as to separate them, but we must not confound them. Mind is one thing and matter another, though, indissolubly connected in the human organism, one cannot even begin to act or begin to be without the other. The germ of the soul must start with and progress with the germ of the body; certainly if one precedes, it should be the soul. When does immortal human life begin? Not an instant later than the human body begins to organize; and we may reasonably assure ourselves that the immortal part will survive every catastrophe, however premature its occurrence, in the history of a human life. Life is sacred, and human life is divine; there is no period in its progress less sacred and immortal than another.

All science goes to show that mind and body are as closely connected in time as in organism. Physical activity and psychical activity are simultaneous,

invariably interacting. Sometimes nervous changes seem to precede and induce mental phenomena, as in impressions by the organs of sense ; in other cases mental states seem to precede and cause physical processes, as volitions which induce muscular activities. There is a great deal of careless and vague expression in regard to the activities of mind and matter. Physiology describes the material part which is necessary to a comprehension of the activities of the immaterial part, but must not be confounded with it. The brain is not the mind. Thought, is not mechanism. The nervous accompaniment of a mental phenomenon does not account for that phenomenon, it is only its medium. The difference between the two is one of kind. "No sound psychology," says Sully, "is possible which does not keep in view this fundamental disparity of the physical and psychical, and the consequent limits of the physiological explanation of mental facts."

We can all study mind for ourselves. Direct your attention to the state of activity of your own mind at present, consider its processes, note its stages of thought, its methods of activity. This is the subjective study of mind, and is a necessary preliminary to the objective study, since it is only by comparison

with the consciousness of our own mental phenomena that we can observe that of other minds. The introspection necessary to the subjective study of mind presupposes a power of abstraction, and requires a certain maturity of thought and judgment. In proportion as our observation and analysis are complete and our discernment clear, so our conclusions are valuable. We must study for ourselves and exercise original investigation. Psychology is still in a formative stage as a science; we can add to its data. Leading thinkers and students in this direction invite the aid of all who have the power, inclination, and opportunity to observe in this realm, and thus contribute to the sum of the knowledge of mental phenomena, that the science of psychology may be built up. The teacher has the child-nature constantly before him to observe; he is bound to observe it carefully, that he may be able to handle it wisely and to meet its needs. It is a great privilege of study as well as of work. Frœbel says, "If you want to understand clearly the regular working of nature, you must observe the common wild plants, many of which are called weeds; it is seen more clearly in these than in the complexity of cultivated plants." The same is true of the study of human nature. The young

child's mind and soul in its instinctive stage, without consciousness, concealment, or affectation, shows us the method and order of nature better than the conscious and perhaps perverted, certainly more obscure operations of the more mature mind and soul. The child-nature is a mirror of the universal and essential processes of thought and feeling, and furnishes us with a truer ground-work of knowledge than the exclusive study of our own minds. It is difficult to study our own minds candidly; we must combine the objective with the subjective methods; we may explore biography and history, the drama and fiction, for a knowledge of mind and soul; we may study the history of different races and different grades of life; we must compare and deduce, thus arriving at laws and building up science; we must be exact in our deductions and general in our conclusions, advancing from a knowledge of the individual to the universal. Introspection is necessarily retrospection, since we cannot observe a present but only a past process. We use it constantly as a reference for comparison in studying the minds of others, yet we must not project into this study our own modes of mental activity as an invariable standard. It is hard to understand the feeling or order of

thought of one quite separated from us by time, by surroundings, by inheritance, and by motive; the cosmopolitan can do this more easily than the provincial. How imperfectly the Puritans understood the Oriental mind, imagination, and modes of expression! How inadequately older minds translate the thoughts and motives of childhood! Love and sympathy are strong factors in a right understanding. So nature has supplied mothers before philosophers, instinct before reason. Frœbel found his philosophy in the unconscious methods of mothers. The teacher must not forget his youth, but be able to refer to it retrospectively for his standard of comparison in comprehending the mind and motives of youth. He must add to this sympathy a knowledge of the conditions which govern mental and moral actions; he must study the nervous or physical connections of mind and the physical agencies which affect the nervous system, and through it modify and influence mental and moral phenomena. He will then understand on what the efficiency of the brain depends; *e. g.*, bodily health, circumstances of rest or exhaustion, pain or pleasure, moral susceptibilities, and sympathetic conditions. He must study the psychology of knowing and of feeling, and the physiology of

nervous activity which is essentially connected with it; for his work is to develop and direct thought, feeling, and action during the formative period of human life.

The human mind finds itself in the body as its home while on the earth; this body is its only medium of communication with the outward world, and its only avenue of knowledge or expression, its only organ of activity, and so closely related to it that it is impossible to discover precisely where physiology ends and psychology begins. The body is an essential part of the man as we may study him. If we say the body is purely physical and material, we mistake, for it is not the shifting particles of matter which enter into and pass out of its composition from day to day, but rather that permanent invisible power and pattern, that organic whole with which the indwelling mind is invested and over which it has more or less perfect ascendancy, which begins with its birth and ends with its death, and defies the last efforts of scientific research. Physiology describes its structure, its organs, its laws of growth, but cannot define its essence or trace its finest processes. Does not the mind or spirit peradventure mould the body, directing its transformations until it becomes the

image and copy of the immaterial mind and soul? At least is there not a constant tendency to perfect adaptation of the material to the immaterial in man? Man is a unity of heterogeneous elements arranged in an ascending scale, — body, mind, and soul; each new power introduced includes and dominates all others; his organic life is built upon the material forces of cohesion, gravitation, and chemical affinity, and controls them; his animal life is an addition of new and inclusive force which dominates his physical life, and his rational and spiritual life in turn gives him dominion over both his physical and animal life.

Each of these elements subjects all below it, and could not have been developed, but must have been created, or the fundamental law of cause and effect would be violated. !!

At every point of transition in nature great care is taken to soften the gradation, to merge imperceptibly one form into another and one function into another, so that we are often unable to perceive the limit on either side, and cannot closely define the separation of kind. This misleads many into the notion that no new element is introduced as one form gives place to a higher, and they are led to think that the higher is evolved from the lower without a

direct step of transition or creative act; this would be contrary to reason, as the lesser cannot contain the greater, nor the imperfect the perfect. Also, the phenomena of mind are incompatible with the laws of matter, being originative, directive, and self-active, while matter has none of these powers; and although some of the physical processes closely resemble the mental, as, for example, the automatic and reflex action of the nervous system, the adjustment of means to ends in all the organs and processes of the body, so that it is difficult to say where reflex and automatic action end and intelligent volition begins, — and although many of the bodily processes are inscrutable, as, for example, the assimilation of food, the building up of the bodily tissues, the connections of the mind with the brain and nerves of sensation, and of the will with the nerves of motion, — yet we are sure that the mind is wholly different and superior to the body, and presents a radically new element and type, since it is only through the mind that we know the phenomena of matter. Many have thought the mind identical with the brain and nervous system, which involves the absurdity of giving to matter and mechanism thought and consciousness. The brain is a part of the body and dies with

it; and although the functions of the mind are affected by the condition of the brain, yet a study of the phenomena of mind teaches us that the brain, as well as other parts of the body, is but the tool and the servant of the mind, and not an essential part of it; the brain is the medium of communication between the mind and other parts of the body, and the mind's only organ of activity in this life. The business of the mind is *to know*, and this is pursued by consciousness and by the senses. The certainty of knowledge obtained by these avenues is assumed by reason of our belief in the integrity of the Creator, who could not deceive or mislead his creatures by the faculties which he has given them, or play them false through the only means with which they have been endowed for learning the truth. We must regard the senses and consciousness in a sane man as trustworthy; if they do not give us certainty of knowledge, then is there no hope of it in this life. The mind has the capacity to know, and is provided with the means of knowing; these means of knowledge are the occasions for all the activities of the mind. The revelations of the senses and of internal consciousness cannot be denied; all men treat each other as if the belief in them were

inherent and universal, and any man professing to doubt them is said to have lost his reason. The revelations of the senses are gradual, and lead us to a knowledge of the outward world and of the material universe; those of the consciousness are fundamental conceptions, innate ideas, or *intuitions* (a structural part of the mind), necessary to apprehension and thought and to the reception of all other knowledge.* The idea of *personal identity*, of *being*, of *space*, of *time*, and of *number*, are among the intuitions of the mind; we cannot conceive their negation. Belief in actuality of being is a condition necessary to every process of thought, although *being* in its essence is an unsolved mystery; we do not approach its solution by any process of simplification through evolution, for its origin and elements are beyond our powers of investigation.

The activities or faculties of the mind may be classed, according to their natural order of develop-

* The intuitions of the mind are regarded by modern psychology as that thoroughly organized knowledge obtained through the experience of many generations, like instinct in animals. However they may have become constituent elements of the mind, they are now so to the extent of unconscious and automatic activity, and must be accepted as the foundation of all conscious and voluntary mental activity.

ment, into sense perception, memory, imagination, judgment and reason, and taste. These lead man to a knowledge of all science, literature, and art. As a step to the consideration of these activities, we should study the nervous processes which express them, or physiological psychology, which underlies all mental phenomena.

CHAPTER II.

PHYSIOLOGICAL PSYCHOLOGY.

PHYSIOLOGICAL psychology starts from the standpoint of physiology and investigates the bodily functions which accompany mental phenomena, seeking to discover the correspondence between mental and nervous activities. It attempts to explain psychical phenomena by those bodily or nervous activities which arouse or express them, and which connect the mind with the external world through the senses and their appropriate sensory nerves, or through the motor nerves and their appropriate muscular activities. In studying this branch of psychology we observe the changes in the nervous organism, and notice especially what movements or states of the brain accompany the several processes of thought.

The nervous system is the immediate organ of the mind. It consists of the brain, the spinal cord, and cerebro-spinal nerves; also the sympathetic system of nerves which maintains the automatic action of

the organs of respiration, circulation, and digestion. All these form parts of a whole, the unity of the system being complete. The nerves and spinal cord are merely extensions of the brain tissue.

Nerve tissue is soft and marrow-like. In the brain it appears like a gray, pulpy, undulating coil, with silvery white fibres inside the gray; and in the spinal cord, white and silvery outside and gray within. The nerves, which extend to every part of the body, appear like silvery white threads branching and ramifying from the roots, which are sent from the spinal cord through lateral holes in the spine, and from the brain to the organs of sense through holes in the skull. Each nerve has two roots, the motor and the sensory; these run side by side and form one silvery thread, which also is made of many twisted fibres. The two cords are distinct in each nerve and distinct in their offices, — one carrying sensations or sensory impressions to the brain or spinal cord; the other carrying motor impressions from the brain or spinal cord to every part of the body, — so that each nerve includes the sensory and motor fibre, which act independently of each other except as they meet in the brain or spinal cord. The nerve fibres conduct the nervous energy to and from the nerve centres, and

connect and unite all parts of the brain in a network of fibrous tissue. The sensory nerves from all parts of the body convey impressions of sensation to the brain and spinal cord, which send back by the motor nerves the impressions of the will or intellect to the muscles. This fibrous tissue connects the whole nervous system, and serves at the same time to carry nutrition to the nerve centres. The gray matter of the nervous system is the seat of intellectual activities. In the brain it is coiled and convoluted in such a way as to obtain all the surface possible within the limits of space. It is so managed as to furnish the greatest opportunity for vibrating or undulatory motion and complexity of structure. The volume of the brain and the number of convolutions are in proportion to the degree of intellectual power. In animals the brain is smaller and less convoluted than in man; in men of feeble intellects less than in men of great mental power. The degree of intellectual power seems to depend not alone on the volume or size of the brain, but quite as much on the degree of complexity of structure.

The brain is divided into two hemispheres or lobes, associated with each other by fibres which unite them so intimately that their molecules vibrate in

texture of the Brain - quality.

unison. The front and upper portion of the brain, which is seven eighths of the whole mass, is called the cerebrum, and is the centre of all purely intellectual activities; its two lobes have each three divisions; the folds or convolutions are separated by clefts, sometimes nearly an inch deep. The cerebellum is a smaller portion of the brain similar in appearance and structure to the cerebrum, lying between the spinal cord and the cerebrum; it seems to be the medium of communication between the intellectual activities of the cerebrum and the motor nerves; it stores up and condenses the impressions received by the sensory nerves, and is the seat of the sensory and motor influences; it furnishes a reservoir of energy to every department of the brain, incessantly distributing through all its fibrous connections a continuous current of electric force through the nervous system, showing itself in every conscious or unconscious nervous act. Some of the nerve fibres from the cerebellum pass into the spinal cord, connecting the nerve cells of the brain with the ganglia of the motor nerves of the spinal cord, pursuing a descending and oblique course from the brain into opposite regions of the spinal axis. This explains the fact that paralysis of one side of

the brain affects the muscles of the opposite side of the body. The medulla oblongata is the thick upper part of the spinal cord which it connects with the cerebellum; it contains the nerve centres of the physical functions necessary to life; if injured, death follows instantly. The gray substance of the brain is one eighth of an inch thick in the cerebrum and irregularly distributed outside the white or fibrous portion. The coiled gray pulp, on being examined by a microscope, exhibits a conglomeration of nerve cells, each a unit with nerve fibres, connective tissue, and capillaries. The brain cells are pyramidal in form but unequal in size, parallel to each other in a series of layers, with their summits all pointing outward and upward to the surface of the brain, the smaller cells nearer the surface, the larger ones deeper within, all united by a net-work of nerve fibres into which the cells spread out on all sides in a delicate radiating fringe which forms the fibrous tissue; the transition from the smaller to the larger cells is brought about by insensible gradations. The color of the brain cells is an amber yellow, with a bright nucleus and white nucleolus of nerve fibre, which is plainly seen through the transparent cell, and is the unit of the cell, but divisible itself into

filaments. Nervous action is propagated in vibratory undulations from one cell and one point of contact to another. The small cells are the seat of the phenomena of sensation, the large ones of motor influences.

In the very centre of the brain is an ovoid body of reddish color, called the optic thalamus, composed of four ganglia of gray matter and two bands of grayish substance continuous with the gray matter of the spinal cord; it contains the foci of concentration for the activities of the special senses, smell, sight, hearing, and touch. The distinct ganglia vary in size, according to the development of the separate senses; each ganglion is directly connected with its appropriate sense organ by the nerve which conveys the sense impression, vibrations being communicated from the outward world to the nerve and nerve centres by the nice mechanical contrivances of the organs of sense. This localization of sensorial impressions has been abundantly proved by experiment on living animals; also the fact that the size and degree of sensibility of these ganglia may determine in a great measure the native predisposition of any organization. If a certain sense be destroyed, its appropriate local brain centre will become in-

active and shrivel. These ganglia, either excited or deadened, affect correspondingly and immediately the sense activity with which they connect. The special connection of certain fibres and zones of the brain is proved by experiment of a galvanic current applied to those portions, producing appropriate activities in the extremities of the nerves; *e. g.*, electric excitement applied to the optic ganglion will cause the eyes to move, and the tongue or neck may be made to turn by artificial excitation when there is no actual sense impression or volition. Those who have lost any of the senses gradually suffer the wasting of the corresponding ganglia of nerves; those who have had a limb amputated eventually lose the activity of the motor nerve centres which connected with the lost limb; the disused parts of the brain become inactive.

The spinal cord is a cylinder of soft nerve tissue of white and gray matter; the gray matter is enveloped by the white or fibrous tissue. The sensory nerves from all parts of the body carry impressions to the spinal cord, which carries them to the brain, and the brain sends back by the motor nerves the impressions of the will and intellect to the muscles. The different groups of motor nerves

radiate from different segments of the spinal cord, and are regularly laid one above another like a series of electric batteries, always ready to start into action at the call of the appropriate stimulus. All nerve activity reacts upon the particular structure engaged, modifying it so as to bring about a disposition to and facility for that kind of action, leaving traces or channels of activity in the structure of the nerve substance so as to produce organic tendency and automatic activity of sets of associated cells. The brain and spinal cord are constantly storing up associated sensory impressions, and acquiring habits of motor impressions which result in unconscious movements. The spinal cord is, by habit and training, enabled to receive and put forth impressions which become automatic motor actions, carried on without connection with the brain itself; the spinal cord thus acquires a power of its own; this power is called the reflex action of the spinal cord, and is shown in walking, dancing, playing the piano, and any physical movements at first requiring intellectual direction, but which have become unconscious through habit, being performed without reference to the brain. If the spine is broken so that the pressure on the spinal cord cuts off the connec-

tion between the brain and lower motor nerves, the irritation or tickling of the feet will cause the legs to kick out without consciousness or volition; if the feet slip, the body immediately tends to recover itself; the fingers involuntarily draw away from heat, and many other actions are performed by the reflex activity of the spinal cord, this reflex power being the result of inheritance or training and a kind of memory of the spinal cord.

The sympathetic nervous system is a double chain of nerve knots or ganglia connected by nervous cords in front and on each side of the spine; these cords are connected with each other and the sensory roots of the spinal nerves by a net-work of gray tissue; from these knots of nervous substance fibres branch to all the internal organs, and so distant organs act in sympathy with each other, as the head and the stomach; thus, disorder of one function may be symptomatic of disease of another organ. The sympathetic system acts more slowly than the other system; it causes the blush, the contraction and expansion of the pupil of the eye, and the accommodation of specific muscles to the nervous demand.

The nerves of touch extend to every part of the body and receive impressions at their extremities:

in the fingers they terminate in a fold or plexus which is especially sensitive to vibrations. The gustatory nerve terminates in the mouth, and has its most sensitive point in a row of folds or ganglia near the base of the tongue. The olfactory nerve is spread out on the lining membrane of the nostrils, and responds to vibrations caused by odors. The auditory nerve reaches the inner ear, where it is acted upon by the movements of tiny granules in a liquid, which undulates at the touch of the several little bones, conveying the vibrations of the drum of the ear caused by the percussion of the waves of sound. The optic nerve is spread out upon the inside of the retina, where it is brought in contact with light. We may therefore resolve all the nervous sense activities into that of touch.

When a sensory impression reaches the cerebrum, it is intellectualized and changed into a volition, which is first developed in the psycho-motor centres of the cerebrum, then received in cells of the cerebellum, where it enters into a more intimate relation with the organic material which is to express it, changing at last from an intellectual to a physical activity. We can only say of these processes that they are inscrutable. The four central ganglia which

convey the sensations to the brain, where they are met by the mental activity which perceives them, and the cells of the cerebellum which transmit the intellectual volition to the motor nerves and produce physical activity, are the organs which transform outward and material impressions to mental and immaterial impressions, and again transform the intellectual volition consequent upon these impressions to organic force and material activity. One process is the reverse of the other.

The brain grows in bulk and develops changes of structure. Structural development is an increase of unlikeness of the several parts or a higher degree of differentiation, also a greater intricacy of arrangement and more complicated special connections. The higher structure of the brain, the cerebral hemispheres, seem to develop later than the lower and have greater complexity. The brain, as an organ of the body, would tend to grow with the growth of the whole body, and like all the organs, grows and develops by exercise. Nerve cells, like all other cells of physical organization, live and act by the nutrition furnished by the blood, and are subject to alternate rest and activity. Sustained intellectual work is accompanied by a loss of phosphorized sub-

stance on the part of the brain cells in vibration. All activity of the nerve tissue as of the muscular tissue oxidizes or burns up its substance, so that every thought, sensation, and volition destroys a part of the substance of the brain; its essential constituents are used up; all moral emotion becomes also the occasion of local heat, and wastes its specific cell substance. Therefore it is absolutely essential to the preservation of the brain that it should be sustained by the circulation of nutritious blood, which is the result of a proper supply of food. It is by the blood that the nerve cells supply their losses; the blood which comes to the brain red, returns black, because the needed elements are extracted. Every cerebral cell expends phosphorus in acting, therefore phosphorized food should be abundantly furnished. When the brain is weary, the blood which flows to it is less, and the exhausted cerebral cells fall into the collapse of sleep, in which condition the temperature is reduced. The exposed brain of a man showed it to be quiet and smaller in volume during sleep, but in dreams swollen and agitated. If the blood circulation is suspended in the brain, the whole nervous activity is interrupted; if supplied, the activity is renewed. The injection of blood into

the severed head of a dog made the signs of life come back, so that the eyes turned momentarily at the voice of the master.

The cerebral substance is subject to an increase of temperature under sensorial impression. An animal has been made to hear, see, smell, or taste by applying heat or electric excitation to the ganglia of sense nerves.

Everything that excites the brain causes an increase of temperature, the degree of which can be measured. This heat is a dynamic force, the direct result of the psychic element on the arrival to the brain of the sensorial excitation ; even the difference of degree of the psychic heat and the sensorial heat can be ascertained. Too energetic or prolonged work of one set of cerebral cells induces chronic congestion and brings on mental maladies ; for every brain activity hastens the blood current and develops heat, a local habit of which may leave incurable brain disorders.

While the development of the nervous structures of the psychical activities related to them may thus seem to depend on organic processes and tendencies, we are not to suppose that the cause or effect is purely mechanical. The mind is developed out of

its inherited nature and out of its surroundings, built upon the basis of its original tendencies and in response to the stimulus of its environment, yet it lies within the formative power of moral and intellectual choice and volition in self-activity. The brain structure of each individual will naturally progress according to the law of the race development; yet training is an important factor in that development, and may determine, to a great extent, its conformity or non-conformity to heredity, and create individual independence of growth and structure.

In a progressive race each new generation starts with an advance on the structural nervous status and the organic mental and moral power of the preceding generation, or in case of any special development, with an advance of corresponding nervous structure.

From a physiological point of view, the voluntary motor act which emanates from the brain is only the repercussion more or less immediate of a sensory impression. It may not be a simple and purely reflex phenomenon, but a complex one, that lays various zones of the brain under contribution and resumes in itself the different elements, so that the

unity at last represents personality ; it is sensibility multiplied by all the cerebral activities in agitation, and becomes the conscious human personality which reveals itself in this co-ordinated series of activities.

CHAPTER III.

SENSE PERCEPTION.

THE most simple, most obvious, most universal, and earliest developed activity of the mind is sense perception. It is the fundamental source of objective knowledge. In childhood it is the only source of knowledge, and the senses are the only avenue to the intelligence. They furnish the contact of the mind with the external world, revealing its existence and properties, and giving the mind material for self-activity. Material things are apprehended by the mind through the organs of sense which connect the mind with its object. These organs of sense are a part of our bodily organization, and their exercise produces sensation. The thing to be recognized and the organ of sensation must meet; all the functions of the senses may be reduced to touch, through impressions of the vibrating medium, if not directly by the sense of touch. When this contact of the organ of sense with its object is produced either directly or

indirectly, sensation is caused; perception follows, which is the primal activity of the mind through sensation, the recognition by the mind of nerve sensation produced by the exercise of the senses upon the objects of sense; this mental recognition we call sense perception; it is the link which connects the material with the immaterial world. Many things in it are unaccountable, and an attentive consideration shows us that a perfect comprehension of our mental powers and their mode of operation is beyond our reach.

In perception there are impressions first upon the organs of sense, then upon the nerves, and finally upon the brain, which are followed by certain movements of the mind. We can study the organs of sense physiologically, and observe their wonderful adaptation to their uses; we can follow the action of the appropriate nerves which serve the several senses. We find the organs of sense to be instruments, mechanical contrivances to assist the mind, furnishing the medium of nerve impressions; the nerve, also, we find to be only a more subtle instrument or medium for brain impression, and the brain itself but an instrument or medium for the operations of the mind, so fine as to be often mistaken for the

mind itself; but no material investigation can show us the entire secret of sense perception; its every point of transition, from matter to mind, defies microscopic or chemical analysis; we cannot understand the intellectual part of an act of knowledge. If the organ of sense is perfectly sound, but the nerve defective, or *vice versa*, the act of perception is defective; and if the nerve and organ are both sound, but the mind disordered or absorbed, so that attention is imperfect, then perception is defective. Sound organ, nerve, and mind, as well as mental attention, are all necessary to an act of perception.

Every exercise of the mind is dependent on attention. This is a concentration of nervous energy upon one group of brain cells. As it is more or less complete, so the mental exercise is more or less productive of knowledge and mental growth. Attention requires as conditions calmness of mind, healthy organs of sense and thought, nervous vigor, and healthy functions. All faculties grow by exercise. Simpler exercise builds up the power for higher. There is a great difference in individual capacity for attention. The most effectual exercise of attention is absorbed, concentrated, inclusive, and active. The best minds have not only great grasp of attention,

faculties in the mind
the best minds are not in the grasp

but great facility for transition from one subject to another. In minds of unusual power the readiness of transition is so perfect as to enable them to attend to several subjects at once, keeping different groups of brain cells at work and accomplishing various kinds of mental operations simultaneously.

The organs of sense are the eye, the ear, the nostril, the tongue, and the skin. These give us sight, hearing, smell, taste, and touch. Our means of outward knowledge is limited to the scope of activity of these senses. We know by experience what we can learn from them. It might have been possible to provide man with other means of knowledge of the outward universe ; it is possible that in other stages or spheres of existence we may be provided with greater capabilities of perception and means of applying them. We may suppose the existence of created beings in the universe endowed with other or more extended powers of perception, with organs of larger scope of activity than ours. We have reason to think that some animals have a different compass of sense perception from man, less in some directions, greater in others, — perhaps with some powers not conceivable to us because not within our experience. The sense of smell in the dog, and the

sense of touch in the elephant's trunk and in the antennæ of insects, the sense of sight in many birds and insects, seem to be finer and more perfect than ours. The bee and many other creatures seem to have means of mutual communication of ideas and discovery of knowledge of which we can form no conception; they are provided with instruments to this end, of different kind or degree from those of man.

The organs of sense do not at once act in their full measure in the child; they do not possess at birth their full power or precision as means of knowledge, as in the lower order of creatures; they are subject to improvement in accuracy and growth toward completeness. The natural exercise they have in their spontaneous activity, in the instinctive search of the mind for knowledge, provides the development they require. The result of their first application to objects of investigation needs to be corrected by experience, and each sense assists the others and gives approximate perfection to sense perception. Knowledge is best attained by the combined exercise of all the organs of sense.

It is the duty of the teacher to exercise and strengthen the organs of sense, and to make the

sense perception as accurate and complicated as possible ; to train the mind to perfect attention to the impressions made on the brain through the senses, so that knowledge of the outward world shall be faithfully and thoroughly received. The eye, which at first perceives only surface and color, is trained by experience with the aid of the other senses to perceive texture, figure, size, number, and distance ; the ear, which at first is quite inactive and very gradually discriminates sound, may be taught to perceive every shade of tone, and many tones at once, until the knowledge to be obtained by it is as nice and exhaustive as possible. The training of the sense of touch, to give a large measure and variety of knowledge to the mind, is finely illustrated in the case of the education, by Dr. Howe, of Laura Bridgman, who, at the age of six, could neither see, hear, smell, nor taste, and whose mind could become cognizant of impressions only through the sense of touch.

The teacher must understand the structure and functions of the organs of sense and their laws of health, in order to strengthen and develop them rightly, guard them from injury, and train them to the perfection of their activity. Nature attends to

the exercise of the senses in a great measure; the teacher should supplement nature in every department of sense activity. We can enlarge the scope of knowledge to be obtained by the eye and the ear by artificial aids; the microscope and telescope assist the sight, and other scientific inventions the hearing. We can improve and intensify the powers of sense by special practice; nature gives this training through the very exercise that demands it. The forester makes his sight keen by living in the forest, and accustoming himself to the demands of his surroundings until he sees the slightest changes of landscape; the turning of a leaf; the impalpable haze amid the foliage, — all reveal to him knowledge which the untrained eye would not observe; the Indian trail, the path of the bee or snake, are shown by indications that escape the ordinary eye; the mariner acquires his power of distant vision by watching the stars and the horizon; the astronomer discerns the faintest nebula by absorbed attention to the heavens above him, and by steadily gazing through his lenses; the artist makes his eye sensitive to contour, to every delicate tint, to every flicker of light and shade, to every hint of beauty, by a constant appeal to nature to show him these secrets.

Professor Agassiz gave to a fresh student the task of gazing with steady attention upon two objects of microscopic investigation, exactly similar at first glance, until he should perceive their distinctions, thus developing the scientist's power of sight. The musician strikes one note on his instrument again and again, concentrating upon it all his listening power, until he hears in it all its harmonic tones; the pioneer listens to the ascending sap to know when spring is near; and the lover of nature hears every bird note in its individual quality, and distinguishes in the multitudinous hum of summer life the characteristic note of every insect. The touch is capable of such cultivation as to convey knowledge which we should not have supposed possible through it alone, as in case of the blind and deaf. This sense education forms a large part of Frœbel's educational plan, and the plays and occupations of the kindergarten are designed especially to provide it and to cultivate the thorough attention of the mind to its object.

The senses are the tools, the instruments, the servants of the mind; we must learn to guard and use them rightly in the best service of which they are capable. We can follow them in their activity

and structure as far as physiology can lead us, but just at the point where the mind receives their communications we fail to trace the process.

There have been many theories regarding the mode of sense perception; that of a rare elastic medium, which transmits vibrations caused by material substances to the surface of the organs, as light, color, sound, odor, etc., which cause corresponding motions of the nerves and brain substance, thus producing sensation, has been most generally accepted.

Sensations have duration and continuance; curious experiments illustrate the fact that the impressions of sight remain upon the brain after the object of sight is removed, so that we project upon any surface the picture which was made upon the retina and seem to see it still. Vibrations of sound remain upon the brain so clearly as to be counted after the sound has ceased. The scope of the senses is limited; as, for example, the eye sees objects only within a given distance or of given dimensions, and sees only the prismatic colors. We discover by the dark lines of the solar spectrum that light contains colors which are not appreciable by the eye, and are therefore dark; the ear hears a very limited scale of tone,

and perceives a comparatively small part of the realm of sound.

The activity of the organs of sense gives us pleasure and produces or stimulates desire of knowledge, if kept within the bounds of health; and although the evidence of one sense has often to be corrected by another, and all by experience, yet on the whole they give us certainty and accuracy of knowledge. This knowledge becomes more and more complex as we multiply the material and combine the activity of the senses; thus we continually enlarge our domain of knowledge and supply the mind with ideas which reveal in their connections not only the properties of matter, but the causes and order as well as the significance of the phenomena of the universe, thus training and developing the mind itself. Aristotle defines perception as judgment. In the act of sense perception we constantly exercise the faculties of apprehension, of comparison, and of judgment, thereby developing the reasoning powers; by the accumulation of facts we exercise the memory, and by their orderly arrangement, the powers of analysis and generalization; also, by the perception of the beauty and harmony of the universe we develop the taste and the soul. It is by this great function of

sense perception that we make all our connections with nature and our fellow-men, and through the mental activity to which they give rise we reach the development of our whole mind and spirit, and the establishment of our relations with the universe and its Creator.

CHAPTER IV.

MEMORY.

IN the natural order of mental development memory follows sense perception. The memory is the faculty of retention. We cannot be said to get knowledge if unable to retain it. The senses inform us of things at the instant of observation. Apprehension belongs to the present, and is the mind's recognition at the instant of sensation or perception ; memory belongs to the past ; yet these faculties are so closely related in their operations that we cannot entirely separate them in our consideration. We have the power of mental acquisition and the power of mental conservation, which together give us knowledge. We have also a power of calling this knowledge into consciousness, or recollecting the information or experience, which completes the function of the mind called memory. The word *memory* primarily means the retentive power of the mind, but popular use makes it include recollec-

tion. The faculty of sense perception would be as useless without the faculty of memory, as either would be without the faculty of recollection, yet they are each distinct faculties. The terms *mental reproduction* or *revivability of ideas*, *recognition* or *conscious memory*, are equivalents of *recollection*.

The knowledge which is retained in the mind by memory is not always present to consciousness; it continues to endure unconsciously, and becomes conscious on demand of the will or on some recurrence of associated ideas, or, after a longer or shorter period, spontaneously. It is probable that all the impressions received by the mind are indelible; many are unconsciously received, many more unconsciously retained, and a large share are never revived by association or will, and therefore never appear to the consciousness. There are multitudes of illustrative experiences on record which demonstrate these conclusions. We can hardly escape the inference, from many such demonstrations, that the power of memory is eternal, and that the impressions of the mind will forever be subject to revivability. Dreams, somnambulism, insanity, delirium, and disease offer many marvellous phenomena which attest the undying power of memory and recollection.

Memory does not apply alone to the intellectual acquirements, but extends to feeling, desires, and volitions, and is an essential element in moral accountability. It is closely connected in its activity with conscience. We could experience neither the penalties of moral transgression, nor the peace of a satisfied conscience, without memory. The chance of the resuscitation of memory in a future existence is one of the strongest arguments for eternal retribution. The oft-repeated phenomenon of the sudden revelation of the whole course of life, as well as its every scene and incident, during the instant preceding drowning, as though a sudden illumination were thrown upon all the recesses of the memory, is an illustration of the possibilities of awakened memory and its effect upon awakened conscience ; so indissolubly are the mind and soul linked in their nature and destiny.

The memory is an essential element in the consciousness of personal identity. I am the same to-day as yesterday, because I find recorded in my memory my consciousness of yesterday. The power of memory and of recollection varies greatly in degree in different individuals and periods of life. Some men can easily commit facts to memory, but

only during a short period are able to revive them in the mind ; others require more repetition and effort in retaining, but can more easily and for a longer period revive the knowledge. In early life the memory is very impressible, but the impressions are apparently easily effaced ; nevertheless many which are not for a time revivable become so later in life, and the scenes and events of childhood, as well as the facts then stored up in the mind and lost sight of during the main period of life, are spontaneously revived in old age, while the later impressions of the mind are forgotten.* Children seem to forget very soon those facts of knowledge which are obtained before the age of seven or eight ; yet the facts of unconscious memory are mostly accumulated before that time, and enter into the mind as organic elements of its activity. Frœbel regards the unconscious knowledge gained before the age of eight as the most important knowledge of life ; on this conclusion as a principle he bases his methods of education. But if you give the child a large list of facts

* It may be that the earliest and deepest impressions on the brain-cells, being afterward overlaid by the more active but less permanent impressions of middle life, are at last brought again into prominence by the disappearance of the secondary impressions.

to be stored in the memory, it will be necessary either to keep them in constant use or to renew them later in life. It seems desirable that the knowledge gained in early life and soon forgotten should be revived by the study of the first stage of maturity, so that all that has dropped into unconscious memory may be made once more conscious and therefore more enduring.

Some minds have a stronger hold upon facts, others upon thoughts or feelings ; some have great difficulty in recalling names and dates, and ease in recalling analogies, ideas, sequences of thought, and *vice versa*. The quality of the mind has been thought by many to depend on this difference ; so that a mind has been judged to be of small capacity when the memory is strong and precise, and of large capacity in proportion as the memory of particulars is vague and uncertain. But the best quality of mind will combine a strong and particular memory and recollection with the ability to reason well, or with a vivid imagination. Seneca could repeat two thousand names in the order given on once hearing. A young man at Padua, it is recorded, could recite thirty-six thousand words in any required order on first hearing them or after a year's interval. Macaulay, Dr. Arnold of

Rugby, and the celebrated Porson are instances of persons of remarkable power of recalling what had been read or heard. Cyrus, Mithridates, Napoleon, the Duke of Wellington, and Washington, all had phenomenal power of recalling names and faces of individuals in their armies.

The memory may be strengthened and trained. Habits of concentrated attention to objects of memory, of association of ideas, of analyzing trains of thought, improve and develop the power of the memory and recollection. Certain ideas naturally excite each other. Simultaneous ideas, contiguous ideas, dependent ideas, ideas of cause and effect, of means and ends, of whole and part, of like and unlike, of contrasted and similar, of object and subject, of symbol and reality, of words and ideas which they represent, of form, sound, color, odor, etc., etc., respond to each other in the recollection. All these can be reduced to the inclusive associations of totality of impression; those thoughts suggest each other which have constituted parts of the same act of cognition; by this solution the whole phenomena of association may be explained.

Therefore, in developing the power of memory, we must habituate the mind to a vivid and complete

cognition, involving strongly all associated ideas. It will be easier to commit words to memory if repeated aloud or frequently copied or said in concert, thus multiplying the means of mental impression. It will be easier to retain ideas acquired under pleasurable excitement in varied and striking connections than without these stimulating accompaniments. The memory will be quickened by a complicated association of ideas and strengthened by constant exercise; if memory is trusted it will grow responsive; if the mind does not at once recall a fact, keep it in a waiting posture and allow nature time to work; the forgotten name or date or other fact will seem to arise spontaneously in answer to the expectation. If we seek something which has been stored up in the mind, we declare by that act that we have not altogether forgotten it; we still hold it by a part, and when this detached part at length presents itself, it reunites itself spontaneously to that with which it was originally connected.

It is probable that the thought of an object suggested by desire is always accompanied by accessory thoughts more or less numerous, present in the mind consciously or unconsciously, which lead to the recovery of the desired thought; this direction of

the mind by the associations of unconscious memory becomes fixed and constant, and results in automatic mental operations, like the act of walking or speaking or reading. In the process of acquiring these acts of knowledge, each step is an object of conscious recollection; the first movements of the muscles, the first memory of the words is conscious and an act of recollection, but at length it becomes a habit, and we are no longer conscious of its operation; we read the page without the conscious recognition of the letters or even the words, but yet each word and letter must have produced its effect on the mind which may at any moment be called into consciousness by attention. In like manner, as we are surrounded by a complication of relations, only a small part of which enter consciously into the mind, the mind becomes filled unconsciously with impressions and elements of knowledge which are subject to our attention and may be recognized at the call of the will, but even when unrecognized enter into the operations of the mind, and even into its very structure, so as to become elements of automatic mental and moral activity, and build up the intellect and character. Every activity of the brain cells leaves its traces in the structure of those cells which become a channel of revivable activ-

ity. This is the physiological explanation of memory which applies to all parts of the nervous system, so that we may speak of a memory of the spinal cord or of any nerve centre resulting in automatic activity.

All automatic activity being incapable of correction, is a part of the consolidated mind and soul, acting with constant energy in its own direction. The unconscious memory is such an agent, and therefore more powerful and important in its function than any succession of conscious memories or recollected facts. It seems to reach a permanent and transmissible structural influence which is unalterable by any act of will. It is in view of this result that all the earliest education is of radical importance, and cannot be overestimated or be begun too soon.

Memory is disturbed by any disturbance of the functions of the brain, sometimes acting more highly under such disturbance. Mental fatigue affects the memory. A tired child will seem to have forgotten his lesson, which will be restored to his recollection by rest of the nervous system or physical refreshment; often by a renewal of fresh air alone.

Many curious instances are related of the effect of disordered brain on the memory. The Rev. Wm. Tennant, while conversing with his brother in Latin,

apparently died ; he was resuscitated and found to be ignorant of every event of his past life. He was slowly taught to read and write, and afterward began to study Latin. One day, while reciting a lesson from Cornelius Nepos, he felt a sudden shock in his head and found himself able to speak the Latin as fluently as before his illness, and his memory was suddenly completely restored. An ignorant servant-girl (a celebrated case mentioned by Coleridge), during the delirium of fever, repeated with perfect correctness passages from a number of theological works in Latin, Greek, and Hebrew ; these were found to be quotations from authors whose works she had heard, without comprehending, at some past period of her life, read aloud by a clergyman in whose employ she was. Dr. Willis relates the case of a man who looked forward to attacks of insanity to which he was subject with impatience, because of the power they seemed to bring of increased memory. He said every mental operation then appeared easy to him ; his memory acquired a singular degree of perfection. There are a vast number of such illustrations on record which accumulate evidence that thought is imperishable. Coleridge says : " It may be more possible that heaven and earth pass

away than that a single thought should be loosened or lost."

Spencer says: "Instinct may be regarded as a kind of organized memory; on the other hand, memory may be regarded as a kind of incipient instinct. The automatic action of a bee building one of its wax cells answers to outer relations so constantly experienced that they are, as it were, organically remembered. Conversely, an ordinary recollection implies a cohesion of psychical states which becomes stronger by repetition, and so approximates more and more to the indissoluble, the automatic, or instinctive cohesions." And again: "Memory necessarily comes into existence whenever automatic action is imperfect." "We do not speak of ourselves as recollecting relations which have become organically registered." "The clearest instance of the gradual lapse of memory into automatic coherence is yielded by the musician. . . . By long-continued practice the series of psychical changes between seeing the notation and striking the key have been reduced into one almost automatic change, — all these mental states which were at first so many separate recollections ultimately constitute a succession so rapid that the whole of them pass in

an instant." "Memory, then, belongs," says Spencer, "to that class of psychical states which are in process of being organized. Conscious memory passes into unconscious or organic memory."

In view of all this testimony, how important is the training and nourishment of the memory. That such facts and images shall be put within its grasp as are worthy never to be forgotten, such as may enter into the very organic structure of the mind and build up the immortal intellect and character; that no habits of thought shall be begun and consummated by the teacher which cannot be woven into the very tissue of the understanding, — this is the great aim of the education of the memory. If sense perception takes in the mind's nourishment and food, the memory digests and assimilates it and thus builds up the individual and race characteristics.

CHAPTER V.

IMAGINATION.

IN observing the child's mental activities, we discover very early not only the faculty of memory, but a very strong and active faculty of reproducing the impressions made on the memory. This faculty carries with it an impulse of expression, so that we see the child acting out in his plays the facts of his observation ; these facts have left an image of themselves so complete as to be easily and instinctively revived in all their associations of place, time, motion, and relation to other facts. It is this power of complete and active revivability and reproduction to which we give the name of *imagination*.

I see a child playing upon the street. He is absorbed in the idea which he is occupied in expressing. Every movement and posture shows me that the image of a proud and prancing horse fills his mind and demands expression through as complete imitation as he can produce. His imagination is at

work and masters all his faculties. Or, perhaps, he imitates the steam-engine, or some other mechanical object, to his mental conception of which he seeks to conform every expression of his body. This mental conception, or image, is a pattern which memory gives him for imitation. To produce this pattern a very complete cognition is necessary; the more complete, the more perfect the imitation or reproduction. If we have observed a material object in its totality of impression on the sense perception; if we have so retained it in the mind, in all its surroundings and qualities, that we are able to reproduce it in its entirety, so that it stands before the mind's eye as distinctively as if the senses again perceived it, — then we produce it, not merely by memory, but by imagination. In other words, we have an image in the mind which may serve as well as the reality for actual representation through expression.

This kind of imagination is very fully developed in the child, as is illustrated by his constant representation in his plays of all that he has observed, — things animate and inanimate; nothing seems so foreign to his nature as that he cannot imagine himself to be it and assume all its qualities, as well as attempt their expression by every faculty he can command. His

instinct to invest any material form with the most unnatural and inappropriate qualities, and convert it into a representation of the image in his mind, enters into all his plays and occupations and gives them life and interest. For example, a clothes-pin serves for a baby, and a chair for a horse ; every form is converted by the power of imagination into a vivid likeness of the conception of the mind based upon the recollection of some observed fact. One quality of the child's imagination is its power of absorbing the child's consciousness ; the thing he imagines appears real to him ; he loses for the time the distinction between what is actually present to his senses and that memory of the past which is actively employed in presenting the image of which alone he is conscious. This absorbing quality of imagination is apparent also in the mature mind, but the discriminating quality becomes stronger and clearer, and there is less confusion of the real with the unreal. This absorption and realization of imaginary ideas leads sometimes to an apparent want of truthfulness, which should be corrected by showing more clearly the distinction between the image and the fact, and not by thrusting on the child's conscience the responsibility of untruthfulness.

The exercise of the imagination in the vivid and thorough recollection of what has been presented to sense perception gives power to description in writing, talking, or acting ; and when the faculties of expression are equal to the presentation of this vivid imagination, the same image is produced in the mind of the witness. The writer, the speaker, the actor, the painter, in this way reproduces for others what was in his memory. Close observation is an essential element of power. The landscape which is faithfully reproduced from memory must have been closely and skilfully observed ; the face, the gesture, the voice, natural to the utterance of emotions of various kinds, must be inseparably associated in the mind of the actor with those emotions in order to be faithfully reproduced as an apparent act of nature. In order to develop the imagination of the child, we must, therefore, cultivate the faculty of complete observation and the acuteness of sense perception in storing the mind with facts which are to serve as a basis for reproduction. We must do all in our power to encourage in a child the instinct for expression, as effort toward expression gives distinctness to the image and thus develops the power of imagination. To this end, give the child all the opportunity it

demands by drawing, moulding, building, singing, acting, and coloring; give it necessary material and necessary tools; train the faculties to the use of tools, and give the mind a knowledge of the qualities of its materials; inculcate the idea of truthfulness and thoroughness, or completeness, in every expression. This connects the working out of the imagination with the sense for conduct and the love of truth.

The plays of the child are nature's methods of development for the imagination; multiply forms and methods in the same direction; follow the individual proclivity as to means; if one child enjoys moulding, another building, another drawing, give each its desired medium of expression, and draw out its native aptness, taste, or genius. Feed the imagination through well-chosen stories or fancies, by poetry, by pictures, by demanding of the child original effort of idea and expression in talking and writing, so as to awaken the responsive enjoyment of others; yet stop short of that excitement of the faculties which disturbs a healthful balance of the physical and mental activity, and especially of that uncontrol of the imagination which tends to confuse the moral ideas. Introduce the exercise of the im-

agination into every branch of study, as it gives vividness to facts and zest and freshness to the intellectual effort of study, adding enthusiastic enjoyment to the act of learning. Reading, language, geography, and history are most dependent upon the exercise of this faculty, and cannot be profitably or pleasantly pursued without it. Numbers depend much on the imagination for effective study, their processes being invested with interest by presentation through the imagination as connected with real transactions and the business of life.

Imagination is not only the power of complete cognition and representation, but the power also of reconstruction. When various facts of memory have become so habituated to thought as to be unconsciously disintegrated, their elements enter spontaneously into new relations and connections, so as to gather around a new focus of thought and build a new ideal of imagination; this is an original combination or organization of revived facts of memory and a higher effort of imagination than simple reproduction; it is called the productive or creative imagination, or by some writers, *ideality*. In its most advanced development, combined with unusual facility of expression, it constitutes genius. For

example, an artist may bring together into a new unity fragments of other unities of landscape, reconstructed according to a new harmony, until he produces a composition or image of his own creation which, although not a copy of any real landscape, may be said to be true to nature because faithful in its parts and in its unity to the plan or harmony of nature. Even a copy of a landscape must be true to this harmony; if it be true only to the details of the landscape, it does not reproduce in the mind the feelings excited by the real landscape, and is, therefore, not true to nature; it is only the artist who sees and embodies even in a copy the key to nature's beauty. The productive imagination makes for its expression a new harmony out of the revived facts of memory. Some philosophers assert that no exercise of the imagination can be called creative, inasmuch as it furnishes no material which has not been stored up by the memory, because the mind cannot form a conception whose elements have not been provided by experience or observation. But is not this new harmony, this new unity, this act of reorganization, a creative act? It furnishes a new ideal of thought or feeling which is essentially original, although made up of parts of remembered things.

So the act of the magnet in grouping the iron filings into a symmetrical order, so the process of crystallization and polarization, readjusting atoms into harmonious relations, so the assimilative function of the body, which converts to its own uses the changing material of the body, is a creative act, and a fair illustration of the creative power of the imagination. An ideal landscape, an original grouping, so harmonized as to present clearly to the mind a new image or focus of feeling or thought which calls forth responsive emotion, an historical scene conceived by the artist, a personification of some impersonal idea, a symbolic painting or statue, a monument of architecture, a musical composition, a poetic expression of fancy, a character or scene of fiction, a fairy, a faun, a Pegasus, a god,—all these are results of this higher effort of the imagination, which is essentially creative. Poetry, painting, sculpture, architecture, musical composition, dramatic acting, mechanical invention, and even the higher mathematics and the sciences, are all fields for the exercise of this power.

The imagination has its limitations ; it can never produce elements which have been altogether outside of its experience, any more than a blind man can

conceive of color. Even when it forms a new combination which it invests with a new individuality, yet all parts of that combination are furnished by the memory, either conscious or unconscious. The character of a drama or story which is presented so clearly as to become a person in the mind of the reader as well as the writer, like Puck or Ariel, Portia or Shylock, is yet made up of qualities which have been the object of such complete observation as has made them a constituent part of the mind's furniture, and ready to reunite in new forms and processes of unification.

The memory and imagination, so closely related and merging into each other almost imperceptibly, are yet perfectly distinct in their activity; this distinction is invariably perceived by a sane mind. The degree of activity of imagination possessed by a man need not confuse his recollection; he can always tell with certainty what he remembers and what he merely imagines; his veracity is not affected by his power of imagination. It is essential that we should preserve this clearness of discrimination, and never lose the ability to subordinate the imagination to conscience or to perceive the precise outlines of truth.

The imagination easily yields to the law of habit or automatic tendency ; it grows by exercise ; it submits to control ; and is more effective under the influence of systematic training. The cultivated imagination is superior to the uncultivated ; the one is finished, the other crude ; the one moulds men and things, the other is wasted ; the one bears fruit, the other is comparatively fruitless. Constant effort and labor, training and study, are essential to the best exercise of even the productive imagination. No one achieves distinction in art without persevering work and constant progress in education. The greatest genius imposes the greatest amount of arduous labor on its possessor, and requires persistent practice and intense efforts of will for its accomplishments.

Imagination connects itself thoroughly with the moral faculties ; if allowed to construct ideals of degradation, or revel in visions of vice or horror, it becomes unable to rise to purer and more spiritual ideas, and *vice versa*, so that it acts with ever accelerating force to drag down or lift up the soul ; it adds wings to simple belief, and brings the unseen vividly to the soul's apprehension ; it presents "the substance of things hoped for," and is, therefore,

equivalent to faith when applied to the soul's activities ; it is as direct a source of inspiration to high thought and conduct as nature has provided, and leads us to the verge of life with joyous expectation. It assists the soul in grouping about the moral ideals the highest conceivable qualities, and makes them facts of consciousness. These ideals of beauty, of harmony, of goodness, of truth, of purity, nourish the soul. The impulse for expression which always accompanies a vivid and active imagination, exercises and strengthens the habit of truthfulness through faithfulness of its expression to its ideal. It involves the attempt at utter conformity of the expression to the conception, which is the essence of truthfulness. This conformity must be seen in the details and in the spirit of the product of the imagination, and is the lesson of nature to the soul through art, which is the point of communication between the active imagination of the worker and the receptive imagination of the observer. Imagination is an active faculty, and must work itself out in forms which shall reach other minds and reproduce in them images. The stronger the faculty of imagination, the more determined its impulse for expression, and the greater its instinctive desire for response. It must

reproduce itself not only in forms, but in effects ; it must bear fruit, or it will not yield happiness or satisfaction. It therefore educates the soul to activity for others, to reciprocal human relations, to sympathy of thought and feeling. This phase of its development should be encouraged in children. It intensifies our perception of our relations with our fellow-beings by deepening and multiplying our points of contact and sympathy, by enabling us to place ourselves in their position and appreciate their motives ; it gives us more varied sources of joy and sorrow, makes us capable of stronger and more varied emotions, and more susceptible of impressions ; it furnishes a pattern or ideal for both conduct and art which either may copy by skilled methods and mastery of its material. The mind and soul should be trained to this mastery, that they may serve that great automatic power of imagination which is called inspiration when the imagination becomes an unconscious agent of the soul. In such an absorbed and automatic process of the soul, where it connects itself vitally with the highest sources of thought and feeling, great ideals, or patterns, are revealed to man, which subordinate all the faculties of the mind and soul and command their activities.

This is the highest development of the human spirit, and authoritative in its expression. So far as it is approximated in any individual life, it compels obedience. "See that thou do all things according to the pattern which I shewed thee in the mount," were the words which defined the obligation of Moses in building the tabernacle, and are pertinent to every one who receives such a pattern for art or conduct.

Dreams are an effect of the uncontrolled imagination, and may be inconsistent with nature, and fact. They sometimes rearrange the facts of memory logically, at other times they are without sequence or reason; while they occupy the mind they seem real. A man dreaming of the same scenes every night in continuous order might find the visions of the night to present as real a phase of life to his consciousness as the experiences of his waking life. Somnambulism is the unconscious action of the dream, when the absorbed mind directs the will spontaneously; in such a state memory and reason are preternaturally active, the dreamer speaks fluently, executes feats impossible to his conscious activity, and seems to have perceptions through other means than the senses; at such times it is dangerous to awaken the sleeper. Revery is similar to dreams;

the working of the imagination is spontaneous, but accompanied by consciousness. Insanity is a state in which the imagination under great excitement carries with it determined conviction of the reality of its apparition, and tyrannizes the mind and body as well as the soul, driving the faculties to excessive activity in entire uncontrol of the will.

The bodily functions are powerfully affected by the imagination; diseases are induced by it, and cures performed. Men have been killed by working upon their imagination, exciting expectation of death. The imagination causes sensations which are generally attributed only to activity of the senses themselves. Optical illusions are produced, sounds inaudible are heard, taste and smell operate, and sensations of heat and cold are felt, although no outward cause exists; but the imagination acts so powerfully on the nerves which perceived those sensations as to originate the appropriate activity of the nerves and produce the result of actuality. Even the muscles are affected to express these sensations and emotions as if called into activity by the natural causes. The mouth waters in thinking of a palatable food, as it does in preparation for mastication; the face is moved to smile or frown, or the body to

conform its gesture and posture, or even to talk and act, from the stimulus of imagination alone. It is said, however, that if the optic nerve is destroyed, images of sight are not thereafter reproduced by the imagination; and so of sound,—the want of the appropriate nerve prevents the formation of the image produced by its activity.*

Let me once more call attention to the insensible gradation of the faculties of body, mind, and soul, and their indissoluble connection and order of precedence, passing through incomprehensible steps of transition from lower to higher, each serving its superior, and feeding and nourishing the higher functions of the complex unity of man. Sense perception supplies memory with forms which feed the imagination and conscience, and through all these faculties, in successive degrees of power and more and more immediate connection, the soul is nourished and the human being is educated in symmetry.

*The response of the muscles and organs of the body to an imaginary sensation may be spoken of as an hallucination of the motor-nerves through the unreal image in the brain, which excites the roots of those nerves as actually, though perhaps more feebly, as if it originated with the sensory nerves, and was the result of a sense impression.

CHAPTER VI.

JUDGMENT AND REASON.

IN the processes of mind involved in sense perception, memory, and imagination, we find evidence of a pervading faculty essential to them all, which we call judgment. The function of this faculty is to analyze and compare the facts of apprehension, and draw a conclusion from this analysis and comparison. Every act of sense perception is to some extent a judgment, and involves comparison and generalization, a balancing of associated sensations, and a determining apprehension of their relations. Aristotle called perception an act of judgment.

This faculty of judgment is exercised by the child in gaining his ground facts. He observes qualities, then compares them as to degree, as to kind, as to effect; and on this comparison as a basis he forms a judgment; by this judgment he analyzes, compares, generalizes, and arranges the results of observation which he holds before his mind for this purpose.

Judgment, therefore, includes apprehension, abstraction, analysis, comparison, generalization. It lays a foundation for memory and imagination by grouping or classifying facts in the mind according to every variety of association, so that these faculties may have their material assorted and ready for use.

Watch the child in his play; you see that after observing qualities he naturally compares them. This block is higher, that is straighter; this is smoother, that is rounder; this is brightest, that is darkest, etc. According to this comparison, he goes on to arrangement: these are like, those are unlike; this belongs with the hard things, that belongs with the soft things; this is a living thing, that is a thing without life; this is a mineral, that is a plant, etc. He classifies things either consciously or unconsciously, according to their common properties, and assigns each new fact of knowledge its place in this classification by the law of resemblances. This act of classification is complex; it rests on sense perception and memory, but includes the power of holding a property or quality, that is, an abstract idea, before the mind for analysis or comparison. This power is by some psychologists called abstraction, or the power of mental conception. In all complex opera-

tions there is a series of judgments or decisions founded on a comparison of qualities, and following a natural sequence of cause and effect, or evidence and conclusion. This series of judgments constitutes reasoning.

Concentrated attention of the mind is necessary to the correct exercise of judgment; *i. e.*, a power of reflection, of considering the facts of apprehension as they lie in the mind, and a power of decision when the attention and reflection are complete. The faculty of judgment is susceptible of constant and careful culture. It should be called into exercise at every step of education. It will lead the child to intellectual and moral results which shall be final, to decisions which he need never again question. This result is especially pronounced in the application of judgment to conscience; inductive conscience, or conscience in its applications to courses of conduct, is in many cases purely an act of judgment. In the education of the faculty of judgment and reason, the part of the teacher is to see that no mistake is made in the process; that there is clear apprehension, just comparison, thorough analysis, and orderly generalization. Through this process of judgment the child is to classify all his knowl-

edge, and learn the relations, the uses, and the laws of material things; this is the pursuit of science. By the same faculty, also, he forms a standard of moral action, and discovers the direction of duty.

Judgment becomes more and more complicated as the intellectual and moral faculties advance to their development. A larger field for comparison, a greater number of relations and associations, enter into an act of judgment as facts accumulate in the mind and knowledge increases; but this complexity is met by the accumulation of definite judgments already made. These form a fund of experience which need not be worked out afresh, but contains already elements of knowledge to be relied upon as decisive in further judgments. As fundamental experience and accumulated judgments are fixed in the mind they become unconscious, consolidated, and organic, and are automatic or intuitive in their action; they furnish the innate ideas of the mind and soul and enter into the structure of both, to be transmitted from one generation to another. Thus they are the most important and enduring acquisitions to mankind.

The operations of judgment are common to all men, but the faculty of generalization is very un-

equally distributed, and is one of the highest exercises of the human intellect. Sense perception and memory are common to man and brute animals, but analysis, comparison, and generalization are distinctively human attributes ; yet we see some approach to these operations in the more intelligent and sagacious animals. The instinct of the bee, the ant, the spider , the intelligence of the dog, the horse, the elephant ; the adaptation of means to ends to a greater or less extent by all animals, — indicate the presence of organic if not conscious judgment.

A word alone expresses sense perception, as *rough*, *blue*, *wood* ; but a sentence or affirmation is necessary to express a judgment, as *this wood is smooth* ; *this vessel is a brig*. The act of judgment is not expressed by the name of a thing or quality, but requires a predication or assertion. As sense perception involves a judgment, so all consciousness also includes a judgment or discrimination. We cannot have an apprehension of the relation of things without judgment. We cannot decide upon the moral quality of actions without judgment ; when we have thus decided, then conscience directs us to do the right and omit the wrong, to abhor the evil and cleave to the good, and the will determines our obedience to conscience ;

therefore, judgment, conscience, and will are necessary to conduct.

Anything which disturbs our deliberate attention to the object of judgment, as any passion or emotion or imagination, hinders the correct result of judgment; it may confuse even sense perception, and prevent that just comparison which gives us the true result of observation. This disturbing element operates in the direction of both intellectual and moral judgments to pervert or to blur them. We cannot trust to the justness of our judgment where we are influenced by a strong feeling in one direction or another. We should divest ourselves of a preference before we conclude a judgment. This principle is acknowledged in legal trials by jury; no one is allowed to make one of a jury who has a preconceived opinion respecting the matter to be judged, or who may have any selfish interest in the decision.

Judgment extends to all knowledge and all opinion, to every kind of evidence, certain or uncertain; if the evidence is certain, demonstration and proof result; if uncertain, the judgment is uncertain, the result probable or possible. Good judgment is the result of good sense; nonsense is contrary to right judgment. Common-sense is that degree of judg-

ment common to men of experience in all ages, or that result of common experience which is organic or intuitive judgment. It is that degree of sense which is necessary to our relations with our fellows and our surroundings. Common-sense is a rectifier of individual peculiarities of judgment; it gives a standard by which men can correct their judgments; it is a tribunal of great authority, and its conclusions are according to right reason. It entitles men to be called reasonable beings. Principles of common-sense are axioms, self-evident truths, upon which all men agree, and which are the foundation of all further judgments and all knowledge.

It is not in our power to judge as we wish, but our judgment is made necessary by our evidence and our intuitions. Judgment follows apprehension inevitably; it cannot go back of self-evident propositions. Every conclusion reached by reasoning must go back to axioms. The science of mathematics is established incontrovertibly on the foundation of a few axioms or truths which are apparent to common-sense or natural judgment, although to some minds some principles which require demonstration for most men are axioms also. All sciences are built up in the same way on facts of intuitive knowledge.

In reflecting upon the processes of the mind itself, the mind works in a natural order of reasoning from cause to effect, according to an inherent sequence of judgment which may be analyzed and arranged, and this analysis or arrangement of the order of reasoning constitutes the science of logic and furnishes the rules for correct reasoning.

Axioms, or intuitive truths, are a part of the consciousness, and must be treated, as are the senses, perception, and memory, as the necessary means given us by God for discovering the truth. Our ordinary conduct in life is built up on these intuitive truths and first principles of reason. Any man who fails to recognize them and act upon them is adjudged insane. The axioms of any science are the first things to be settled in the mind in the study of that science, and are at once perceived to be according to the nature of things. There are axioms of taste which are perhaps less universally recognized, but, being perceived by those whose development of taste is most marked, are accepted, on their recognition or revelation, by all mankind. There is a standard of beauty which, though not discoverable by all men, is by all men acknowledged, on the revelation of genius, to be supreme. There are

axioms in morals and in philosophy, on which are built up the moral code and the spiritual development of mankind.

Every code of morals, as well as every form of religious belief, is the result of the application of the judgment, — either the instinctive judgment of common-sense, based on intuitive truths, or the active and conscious judgment of each individual man applied to the moral and religious ideas which have come to his mind originally or through other minds. Each man must decide by a process of reasoning from intellectual evidence what he shall regard as truth, and therefore authoritative. If he makes such decision without such process of reasoning, he has superstition, but not belief. Yet the process of reasoning may lead him to the conclusion that the limitations of his intellect prevent his forming a judgment by such reasoning, and that an authoritative revelation of truth has been made to him which he must accept as he would accept his intuitive truths; *e. g.*, a man may, by evidence and a course of reasoning from historical and philosophical facts, adopt the Bible as a moral and religious authority, and the Christian religion as a revelation of truth which could not have been a result of human judg-

ment, and then accept its statements as truth, even where they extend beyond the domain of reason.

Reason is, therefore, the guide to conviction directly by its own processes within its limitations, and indirectly, or initiatively beyond its limitations, through the revelations of higher agents of perception; it is not infallible, because so often affected by imperfect apprehension, incomplete evidence, a biasing emotion or affection or desire, or by preoccupation of the mind and judgment; yet we are compelled to follow it in the search for truth; but we should regard with suspicion conclusions which do not accord with the common-sense of the race. On the other hand, we should never accept the judgment of others, where common evidence exists, without applying our individual judgment, and drawing the conclusion of our own reason. We should also teach the child to draw its own intellectual and moral inferences, where it can safely be led to form them correctly and reach true conclusions; we should appeal to his reason at every step, that he may acquire the mental habit of perceiving the connections of cause and effect, and the motive and result of his actions.

The child naturally proceeds from fact to opinion

from experiments to principles ; his method is that first laid down as the method of nature by Francis Bacon, and is called inductive reasoning. Deductive reasoning begins with the rule or principle, and is founded on the axiom that what is part of the part is also part of the whole ; it gives the class distinctions, and then draws a conclusion respecting the individual. Inductive reasoning is founded on the axiom that what is true of every constituent part must be true of the whole. It examines a number of individuals to discover a general resemblance or ground of classification, and reaches the law, or principle, by detail. The first begins with a theory, and deduces its facts ; the second begins with facts, and deduces the theory. Modern education proceeds by the methods of inductive reasoning, which are the natural methods of the developing mind.

The highest development of the inductive reasoning is exhibited by the discoverer of nature's laws. Newton, who from the fall of an apple discovered the law of gravitation for the universe ; Franklin, who discovered by experiment the laws of electricity ; Galileo, who came to conclusions regarding the shape and motions of the earth ; Leverrier, who discovered by inductive reasoning an invisible planet ;

Columbus, who found an unknown world by sailing according to the directions of his inductive reasoning, etc., — all these illustrate the power of conviction reached by reason, which is the most thorough and effective use of the intellectual faculties.

In a train of reasoning, every step will be intuitively perceived as a result of comparison and the relation between cause and effect. To comprehend and follow a series of steps in reasoning requires ability and training, but to originate a true sequence and reach a legitimate conclusion which gives certainty of conviction where there is no other authority or knowledge, requires a superior understanding, and combined with imagination, leads to the highest results of genius.

Spencer says: "The actions we call rational are, by long-continued repetition, rendered automatic or instinctive. Whatever the microscopist places under the object-glass is seen inverted and with its right and left sides interchanged. All adjustments of the stage and all motions of his dissecting instruments have to be made in directions opposite to those which the uninitiated eye would dictate. Yet habit renders this reversed manipulation as easy as ordinary manipulation ; it becomes as unnecessary for the

microscopist to take thought how he shall move his hands in the one case as in the other. . . . In short, many, if not most, of our common daily actions (actions every step of which was originally preceded by a consciousness of consequences, and was therefore rational) have, by perpetual repetition, been rendered more or less automatic. The requisite impressions being made on us, the appropriate movements follow, without memory, reason, or volition coming into play. . . . Beginning with reasoning from particulars to particulars, — familiarly exhibited by children and domestic animals, — the progress to inductive and deductive reasoning is similarly unbroken, as well as similarly determined. And by the accumulations of experience is also determined the advance from narrow generalizations to generalizations successively wider and wider. . . . Thus it happens that out of savages unable to count up to the number of their fingers, and speaking a language containing only nouns and verbs, arise at length our Newtons and Shakespeares."

CHAPTER VII.

TASTE, OR THE SENSE FOR BEAUTY.

THE natural activities of the mind bring pleasurable sensations; every act of sense perception in a healthy condition of body and mind brings a feeling of gladness. In the manifestations of the young child this connection is very apparent. The babe in its mother's arms expresses delight at every new act of observation, and it is only when the mind or body is too much fatigued and needs rest that its activity ceases to produce happiness. A pleasurable excitement attends every successful effort of apprehension, of comparison, and of judgment, and the happiness is more permanent and satisfying as the mental activity is more complex and complete. This pleasurable excitement is nature's accompanying stimulus to the desire for knowledge, and to the activity of the mental powers. It may be regarded as a necessary condition of attention and study at every period of life, and facility in arousing and sustaining it a criterion of the power of the teacher; so the

teacher should regard it, and make it an essential accompaniment of his effort to instruct.

In the perception of color alone we find in a young child great enjoyment. The colored ball, which is Froebel's "first gift," ministers to his development. In the perception of sound alone the child takes intense pleasure; light alone gives joy, and noise alone arouses delight. We can judge of the beneficial design of these accompanying sensations of pleasure by contemplating the pain that the same causes produce upon a diseased brain or nerves, when every ray of light distresses and every sound distracts the sensitive nerves. If we allow ourselves to be confined in utter darkness, we may, on being released, have some idea of the joy of seeing light, as the inhabitants of the Arctic region make that day a festival on which the sun reappears after the long night; and if we could be utterly withdrawn from sound, which would be more difficult, as sound is more constant and multifarious than we are at all conscious of without careful attention, we should have some idea, on being released from such silence, of the delight of hearing the faintest vibrations of sound. As the mind develops it experiences equal pleasure perhaps in motion and form; and when light color, form, and

motion are combined and accompanied by music, as in the dance, we have the greatest excitement of sense delight; for when the mind is able to receive a number of ideas severally and unitedly, the pleasure is greatly enhanced. So, when the susceptibility to sound has reached a stage at which it perceives gradations in tone and in degree of loudness and rapidity of succession, it can appreciate the most pleasurable excitement of the senses,—that produced by music. Finally, when to the eye and ear appear not only more complex ideas, but a symmetry or harmony of those ideas, the delight is vastly accumulated, the perception of beauty or harmony is complete, and the faculty of taste is actively engaged.

This sense for beauty is inherent in the mind, but varies greatly in its degree of development in individuals and races. The Greeks furnish the type of the highest development in the realm of taste; their ideas of form, of grace, and of harmony have become the ideals of humanity. The Greek mind seems to have been peculiarly constituted to perceive beauty. The soft airs, the hues of land and sea, all the natural surroundings of the people, cultivated this sense; the unfettered, flowing garments,

undistorted figures of the human body, free athletic development, uncovered forms of children, and bare feet and arms of all the people, were constant models set before them of beauty and grace ; movement in all graceful, natural play at the games and in the palestra was constantly exhibited to their artistic sense. Their motive for art-expression, — working for the gods as an act of worship, offering their very best in the temples, not for their own glory nor for selfish gain, but out of love for divine beauty, purity, and truth, and for which they must conform their own characters and art to divine ideals, — this consecration of art was its great inspiration. Ruskin insists that the fountain of growth for taste is character, and that art will keep pace in its development with purity and virtue of life. The nation which has the purest and simplest ideals of truth, which is least corrupt in life and motive, will produce the highest models of art ; and as principles of rectitude are lost sight of, the sense for beauty and its artistic expression deteriorates.

It is certain that Greek art decayed as the state became corrupt ; the feeling and ideal conception must first be clean and beautiful, and art be developed from the truest moral principle. A few in-

dividuals in the history of the race have excelled all others in this sense for beauty, and became the revealers, or law-givers, the standard-makers for the world. In almost every activity of the mind, taste perhaps more than others, some one race or some few individuals develop a phenomenal excellence, and give ideas which are accepted by all, because they appeal to the common-sense of mankind in that direction as the highest reach of the human mind, the best interpretation of nature, and worthy of general acceptance as authoritative. Such superiority seems to be radically a gift of nature, and makes a man a prophet, a master, a discoverer in his realm. In such ways the divine truths in science, art, and religion come to the mind and soul of mankind, and we learn the absolute meaning of grace, beauty, law, harmony, and goodness. The faculty for perceiving these truths may be developed and strengthened from earliest childhood by familiarity with types of grace and beauty, and by *attention* to the form, color, and harmony of objects ; also by giving full opportunity to the instinct for copying nature, satisfying the imitative propensity which is so natural and spontaneous in childhood. All of Fröbel's plays lead to this, as well as his occupations. Associa-

tion of ideas of wonder, sublimity, grandeur, and fitness is a strong element in the evolution of the sense for beauty. Reflection upon the truths suggested by forms and combinations brings out the harmony and unity of their relations ; the perception of the symbolism and analogies of nature in all their points of correspondence with the things of the spirit, brings one to a higher appreciation of their beauty. That man enjoys a form of beauty who understands most thoroughly its significance as well as the symmetry of its lines ; he discovers most beauty in nature who perceives all its associated ideas of use, of design, of cause and effect, of creative power and love, of providence and holiness ; the flower is most attractive to one who sees all its symmetry, its mathematical arrangements of parts, its adaptations to a central purpose, its evidence of divine immanency and its fulfilment of divine law, although its color, form, texture, and arrangement may at once delight the eye. After studying Darwin's exposition of mechanical contrivance in the orchids to perfect their growth, and of the habits of the tendrilled plants to secure their necessary conditions, the pleasure we before took in their exquisite beauty and grace is increased a hundred-fold ; for science ever enlarges our sense

of beauty. The starry firmament gives deepest satisfaction to the sense for harmony when we understand somewhat of its immensity, of its complexity, of its order and harmony, of its laws and processes, and all its sublime suggestions of eternal power and love.

So our ideal of beauty is constantly corrected and uplifted by education ; we learn to perceive new and dominating elements of beauty which lead us to truer standards, and to read more truly and fully the language of the material universe as an expression of the absolute beauty of God.

Adaptation of any work to its uses or purposes ministers to the sense for beauty and gratifies the taste. For example, the great Corliss engine, which was the motive-power of all the mechanical operations in the Centennial Exposition, produced the effect on the mind of some great and sublime work of nature ; the observer stood awe-struck before its power and grace of motion. All inventions of genius arouse the sense for the sublime. There is a beauty of moral power and use which is seen in noble and harmonious character ; we admire a symmetrical life. Novelty and freshness of form or combination pleases the taste, especially a crude taste ; a more mature sense for

beauty emphasizes harmony and proportion, — the general tone or structure, the proper subordination of parts to the whole, the proportion, right order, sequence, and unity in every direction of art, sculpture, architecture, music, poetry, etc. The revelations of science, of the microscope and telescope, — every means by which we are led to deeper and purer emotions and ideals, — are helps in the growth of taste.

The sense for beauty is as distinctively a human faculty as any of the intellectual faculties. It is shown in every grade of social advancement. In the barbarian it is displayed in the love of color, of ornament, of gay apparel for his own person, and for his possessions, his tent, his tool, his horse, and in his love and sympathy with nature. The ideal of beauty may be very imperfect, yet the sense for it is shown in the crudest attempts to produce it. In its fullest development of ideal and production it makes the artist, and through the expression of his skill the immortal works of art, in painting, sculpture, architecture, music, and poetry.

The possession by man of this sense for beauty discloses to our minds the existence in the universe of the good, the true, the beautiful, and the harmoni-

ous. Art is but a nearer and nearer approximation of the human mind to the beauty and harmony of nature, the law and order of the material universe, and the juster and fuller interpretation of the mind of God ; for nature is but the expression of these attributes of the Creator, the eternal types of thought, the final standards of beauty. In this view taste is the effort of man after the beauty of God, the sympathetic germ of likeness to the divine harmony. A genius for art signifies a discernment of the natural elements and laws of beauty, and constitutes a man a universal teacher in the principles of art. Michael Angelo, in painting, sculpture, and architecture, was a universal artist ; others have been as great in but one department, as Raphael in painting, Phidias in sculpture, Beethoven in music, Shakespeare in the drama, Dante in poetry. They each discovered and copied the divine pattern of beauty in one direction, as Newton discovered the law of gravitation. So, even in the direction of lines, there has been found a natural pattern of grace called the *line of beauty*.

The most ignorant, even a child, may admire a work of art, though he knows not why. It appeals to his instinctive taste. But when he learns the

secret of its beauty, he comprehends more perfectly and analyzes its effects upon him.

The cultivation of the taste adds to our sensibility to both pleasure and pain ; as we are more greatly delighted with beauty, so are we more greatly disturbed by the want of it ; yet we should not, on this account, withstand the culture which leads to the finer appreciation of perfection.

We must enter into all the suggestions of the beauty which we see or hear if we would enjoy it fully. For example, one of Beethoven's sonatas must be comprehended in all its design and scope, in all its technique and detail, in its balance and proportion, in its composition and harmony, and in the true interpretation of its unity, if adequately appreciated and responded to. Its melody, its harmony, its significance, its wholeness, its contrasts and correspondences, its order and arrangement, and its suggestions of feeling and thought, must be studied that its entire beauty may be perceived and the taste brought up to its demands. Beauty is a very powerful influence in the world. Beauty of person and face has swayed the greatest minds and fixed the fate of nations. When the old men of Ilium had begun to question the necessity for keep-

ing up such a war merely on the issue of a woman's beauty, Helen appeared among them in her enchanting loveliness of face and form, and they were at once set to carry on the war, so uncontrollable was the influence of her personal beauty. "There is nothing," says Addison, "which makes its way more directly to the soul than beauty." In every operation of taste there is occasion for the exercise of judgment. If it be said that the perception of beauty is merely a feeling in the mind that perceives, we may show that when analyzed it is a judgment regarding the conformity of the quality or object we observe to our standard of beauty in art or nature. The sense for beauty involves an opinion concerning some quality in the object that appeals to it.

The development of taste or evolution of the sense for beauty is apparent within the limits of type, but there is a chasm between the sensations of the brute and those of the human soul that no bridge can span, and that involves a new act of creation, a superinduced and dominant power that could not have sprung into existence except in obedience to a divine force of organization, however nearly the limits of type approach, and however gradually they seem to merge. The point of connection between

brute sensation and the soul's sense for beauty can no more be traced by physiology than the connection between body and mind, spirit and matter, can be followed by the microscope or the analysis of the chemist. Spencer says :—

“By compounding groups of sensations and ideas, there are at length formed those vast aggregations which a grand landscape excites and suggests. An infant taken into the midst of mountains is totally unaffected, but is delighted with the small group of attributes and relations presented in a toy. Children can appreciate and be pleased with the more complicated relations of household objects and localities,—of the garden, field, and street. But it is only in youth and mature age, when individual things and small assemblages of them have become familiar and are automatically cognizable, that those immense assemblages which landscapes present can be adequately grasped, and the highly integrated states of consciousness produced by them experienced. Then, however, the various minor groups of states that have been in earlier days severally produced by trees and flowers, by fields and moors and rocky wastes, by streams and cascades, by ravines and precipices, by blue skies and clouds and storms,

are aroused together. Along with the immediate sensation there are partially excited the myriads of sensations that in times past have been received from objects such as those presented. Further, there are partially excited the multitudinous incidental feelings that were experienced on these many past occasions; and there are also excited certain deeper, but now vague, combinations of states which were organized in the race during barbarous times, when its pleasurable activities were chiefly among the woods and waters. And out of all these excitations, some of them actual, but most of them nascent, is composed the emotion which a fine landscape produces in us."

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